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10/566,743	01/31/2006	Giorgio Macor	11/2-22934/A/PCT	2267

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EXAMINER	
HORNING, JOEL G	
ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
11/04/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/566,743	MACOR ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-15,17,18,20 and 22* is/are pending in the application.

4a) Of the above claim(s) *20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-15,17,18 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05-13-2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. In the response of August 16th, 2010, applicant has not modified the claims. Claims 1, 3-15, 17, 18, 20 and 22 are currently pending.

Election/Restrictions

2. This application contains claim 20 drawn to an invention nonelected with traverse in the reply filed on June 5th, 2009. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1, 3-6, 8-14 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bauer et al (US 6548121) in view of Affinito (US 20040011288) in

view of Borden et al (US 4233130) as evidenced by Callister (Callister, William D. Materials Science and Engineering: an Introduction. 4th Edition. (1997) New York. John Wiley and Sons. p 477.).

The instant **claim 1** is directed towards a process for the production of a strongly adherent coating on an inorganic or organic metallized substrate, wherein:

a. A low temperature plasma treatment, a corona discharge treatment or a flame treatment is carried out on the metallized substrate;

b. One or more photoinitiators containing at least one ethylenically unsaturated group are applied to the substrate to form a layer which iis *optionally* dried to remove solvent if present, and then

c. irradiating the layer of step b 1-1000mJ/cm^2 of UV/Vis light having wavelengths from 150-700nm to fix the one or more photoinitiators in the layer of step b, and either

d1. the substrate so precoated with photoinitiator is coated with a composition comprising at least one ethylenically unsaturated monomer or oligomer, and the coating is cured by means of UV/Vis radiation or an electronic beam; or

d2. the substrate so precoated with photoinitiator is coated with a printing ink and dried.

It is noted that the step "b" drying step is optional. Since the step is optional it is not required for the claim language to be met.

It is further noted that applicant specifically defines a metal or metal oxide substrate to be a metalized substrate (specification page 6, paragraphs 1 and 2).

'121 teaches a process for producing strongly adhering polymeric coatings on substrates, such as what applicant considers to be a metalized substrate. The general process can occur under vacuum conditions and comprises: a low temperature plasma treatment to the substrate; one or more photoinitiators containing at least one ethylenically unsaturated group are applied to the substrate, and on such a photoinitator coated substrate, a composition including at least one ethylenically unsaturated monomer or oligomer [and preferably a photoinitiator, as seen in col 17, lines 49-55] is coated on the substrate and cured by UV/VIS radiation [which '121 further teaches is to be considered between 250 nm and 450 nm, col 17, lines 52-55], forming a polymeric layer of the two organic layers. '121 does not teach repeating these steps to deposit a first polymeric layer and then a second polymeric layer.

However, Affinito is also directed towards a vacuum process for depositing monomer coatings on substrates and then polymerizing them [0002], such as by UV radiation [0019]. It also teaches that such coatings are useful for a wide variety of applications on a wide variety of substrates, including ones the applicant considers metallized [0004]. It further teaches that in some of these applications, it is desirable to deposit more than one layer onto the substrate, specifically, depositing a polymeric layer (by depositing a monomer layer and crosslinking it) and then depositing an additional polymeric layer onto that polymeric layer (by depositing a monomer layer and crosslinking it) [0047], such as in the process of making electrochemical cells, where on a metallized substrate, a monomer layer is

deposited, crosslinked and then coated with an additional monomer layer (which is then crosslinked) [0058].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention performing the process of Bauer et al to first deposit a polymeric layer and then to deposit a second polymeric layer, since it was taught to be a useful combination of layers for a variety of applications, which would produce predictable results. In doing so, a person of ordinary skill in the art would perform a process that *comprises*: a low temperature plasma treatment to the polymeric substrate (step "a"), depositing a photoinitiator and depositing a mixture of photoinitiators with monomers containing at least one ethylenically unsaturated group, producing a photoinitiator layer (step "b"), irradiating that photoinitiator layer to produce a first polymeric layer (step "c") and then depositing an additional photoinitiator and an additional mixture of photoinitiators with monomers containing at least one ethylenically unsaturated group, producing a second photoinitiator layer, irradiating that photoinitiator layer to produce a second polymeric layer (step "d1", **claim 8**).

Furthermore,'121 does not teach what dosage of radiation should be used to cure their polymers.

However, Borden et al is also directed towards curing polymer composition coatings containing photosensitizers (abstract), it teaches that the radiation dosage used to suitably cure such coatings is a result effective variable for determining the degree of crosslinking required in the layer and will vary depending upon the polymer composition used. Since it teaches the dosage per gram of polymer

composition, it is readily apparent that the thickness of the coating would also be variable when the dosage is represented as millijoules per centimeter squared (col 5, lines 57-66). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "1 to 1000 mJ/cm^2" through process optimization to produce the desired degree of crosslinking for a particular polymer composition deposited in a particular thickness, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980) **(claim 1)**.

4. Regarding **claims 3-6**, '121 teaches many different photoinitiators. The photoinitiator can be benzophenones **(claim 3)** (col 17, lines 49-67). The photoinitiator is preferably a subset of the formulas of **claim 4** (col 6 line 61 through col 7, line 8). In which (IN) is further preferably limited by a subset of the formulas of **claim 5** (col 7, line 9 through col 8, line 4). In which (RG) and (RG') are further especially preferably limited by a subset of the formulas of **claim 6** (col 8, line 65 through col 9, line 10). Additionally, example 1 teaches using a photoinitiator which meets the limitations of **claims 4 and 5** (col 23, lines 29-40).
5. Regarding **claims 9-10**, '121 teaches an example 3, which deposits a metal layer on the photoinitiator layer of example 1. Example 1 exposes the substrate to a plasma formed from a mixture of argon and oxygen **(claims 9-10).**
6. Regarding **claim 11**, '121 does not teach appropriate thickness ranges for their photosensitizer containing polymer layers. However, Affinito teaches that in such

vacuum deposition methods thicknesses of 5-10000nm can be suitable thicknesses [0051].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit photosensitizer containing layers 5-10000nm in thickness, since they were taught to be suitable thicknesses for polymer layers to be deposited on such substrates. MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."

7. Regarding **claim 12,** '121 teaches performing the application of the photoinitiator (step "b") as soon as possible after the corona discharge treatment (process step "a") and suggests doing so in a continuous process (col 15, lines 15-20). Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to perform step "b" immediately after step "a."
8. Regarding **claim 13**, '121 teaches that the photoinitators can be used in combination with a solvent (col 15, lines 7-27), so materials other than photoinitiators are taught to be present in the composition. MPEP 2144.05 (II) states: "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'"

9. Regarding **claim 14**, '121 teaches that the process allows a high throughput per unit time (col 1, lines 50-51). The examiner takes official notice that waiting time between process steps is a well known variable for determining the maximum throughput per unit time of a process. Decreasing the waiting times between processing steps, decreases the total time for the overall process and increases the maximum throughput of a process.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to reduce the waiting times as much as possible and perform step "c" immediately after step "b" in order to allow for a higher throughput per unit of time as taught to be desirable by '121.

10. Regarding **claim 22**, '121 does not specifically teach depositing such films on a metallized polymer substrate, or one where the polymer is particularly a thermoplastic or crosslinked polymer. However, Affinito teaches that metallized polymer substrates are useful substrates for the deposition of such polymer films [0044]. Affinito does not teach whether the polymer substrate is thermoplastic or crosslinked, however, as evidenced by Callister, all polymers are classified as being either thermoplastic or thermoset, with the difference between them being that thermoset polymers are sufficiently crosslinked that they do not soften upon heating. Thus, all polymers can be considered either crosslinked or thermoplastic, so the polymer substrate of Affinito would certainly be one of these.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the plural polymeric films of '121 in view of Affinito in

view of Borden et al onto a metalized polymeric film which is either thermoplastic or crosslinked, since it was taught to be a suitable substrate on which to deposit plural polymeric films and would produce predictable results **(claim 22)**.

11. **Claims 7, 15, 17 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bauer et al (US 6548121) in view of Affinito (US 20040011288) in view of Borden et al (US 4233130), as applied to claim 1 above, and further in view of Kohler et al (US 6251963).

Regarding **claim 7,** as discussed earlier in the rejection of claim 1, '121 teaches that the limitations of step "d1." It also teaches that photoinitators can be used in combination with a solvent (col 15, lines 7-27), but does not teach that the solvent is a liquid or what should be done with the solvent after the photoinitiator layer is deposited.

However, '963 is also directed towards depositing films of photoinitiators and teaches using liquid solvents with the photoinitiators in order to form a solution which is then deposited on the substrate (col 18, lines 31-48).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to choose to use a liquid solvent with the photoinitiator compositions containing a solvent of '121 as a known manufacturing option for depositing a film of a photoinitiator composition, which would produce predictable results **(claim 7)**.

Furthermore, '963 teaches that after the substrate is coated with the liquid solution photoinitiator, the solvents are normally removed by drying (col 19, lines 29-31).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to then dry the liquid solution after each layer has been deposited since it was recognized to be the normal procedure for such liquid solvent bearing coatings.

12. Regarding **claim 15,** '963 further teaches drying the photoinitiator films at elevated temperatures (col 25, lines 51-52) and that it is advantageous to dry photoinitiators at elevated temperatures under a vacuum (col 4, lines 39-42). The use of a reduced pressure environment with the heating step would require that the coating be heated inside a vacuum chamber, which would be, by definition, an oven.

Thus it would have further been obvious to a person of ordinary skill in the art at the time of invention to dry the photoinitator coating at elevated temperatures under a vacuum in an oven, since it was known to the art to be an advantageous method for drying photoinitiators and would produce predictable results **(claim 15)**.

13. Regarding **claims 17 and 18,** '121 teaches that the method is used for forming photoinitiator layers for image forming coatings, such as those used in resist technology (col 23, lines 10-16), but does not say how such images are formed by resist technology.

However, '963 further teaches that images are formed by resist technology by covering parts of the wet or dry resist layer (the layer structure after depositing the

monomer/oligomer containing layer and before UV/VIS exposure) with a photomask and then irradiating the layer with electromagnetic waves to crosslink a pattern in the resist (the UV/VIS exposure step) and removing the unexposed (not crosslinked) regions of the photoresist by using a solvent (col 21, lines 13-23).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to modify '121 to cover the deposited structure of a photoinitiator layer and a monomer or oligomer containing layer with a photomask so that the irradiation step would only crosslink a pattern in the coating and then to remove the non-crosslinked regions of the coating (photoinitiator and monomer/oligomer) by using a solvent, in order to form an image in the coating (either the one deposited in step "b" or in step "d1") as taught to be desirable by '121. Using this method is obvious, because it was a known method for producing an image in a photoinitiator layer and would produce predictable results **(claims 17 and 18)**.

Response to Arguments

14. Applicant's arguments filed August 16th, 2010 have been fully considered but they are not persuasive.

15. Applicant first argues that Bauer does not disclose step c. As discussed on page 5 of the office action, Bauer does not disclose step c alone, but in combination with Borden it does. Bauer teaches depositing a layer comprising a photoinitiator (also a layer comprising a mixture of photoinitiator and monomers and oligomers, so both alternatives are included), which is step b, followed by crosslinking that layer by irradiating it with wavelengths of light that overlap the claimed range. The particular

dosage of light is not taught by Bauer alone, but made obvious by the teaching of Borden. This is step c. Affinito was applied to show that it would have been obvious to a person of ordinary skill in the art to deposit an additional photopolymerizable layer onto a (Bauer well adhered) polymer layer that is deposited on a metalized substrate, because such photopolymerized multiple layer structures were known and specifically known to be useful on metallized substrates.

16. Regarding applicant's argument that Affinito does not teach step b, it does not need to teach all the limitations of step b, it is being used to teach the obviousness of the subsequent deposition and curing of additional polymer layers. However, it does teach a step of depositing a radiation curable polymer mixture (like step b) then curing it by radiation (like step c) followed by depositing an additional radiation curable polymer mixture and then curing it by radiation (like step d1).

17. For the purposes of clarification, on page 4 of the outstanding office action states that "'121 does not teach repeating these steps to deposit a first polymeric layer and then a second polymeric layer" by "repeating these steps" the examiner intended to mean an additional step of depositing a radiation curable polymer then curing it after the first radiation curable polymer layer has been deposited and cured, not necessarily repeating an identical process with the same materials to the same thicknesses. The examiner believes the argument on page 5 made this point clearer.

18. Applicant makes "interpretive distinction" arguments on pages 3-4. Both Bauer and Affinito teach depositing radiation cured polymers onto metallized substrates. In the

interpretation used by the examiner, Affinito is used to teach that it is obvious for the polymerized layer of Bauer that relates to steps b and c to not be the final radiation cured polymer layer deposited (but that subsequently deposited radiation curable layers are known to be useful in different applications). The teaching of Bauer benefits from that of Affinito, since it provides applications for a polymer layer system as taught by Bauer. The teaching of Affinito benefits from that of Bauer in that well adhered layers are often desirable (as taught by Bauer) and would be an improvement over layers that would not be expected to adhere as well.

19. Regarding applicant's arguments that the combination of Bauer and Affinito may have led one to repeat steps a-c of Bauer multiple times, above the examiner explains why other combinations would also be obvious. However, if we assume that applicant's argument is true, repeating steps a-c of Bauer multiple times would also read upon the claims.

Conclusion

20. No current claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1712

/David Turocy/
Primary Examiner, Art Unit 1715